AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application.

1. (Original) A method of processing multi-component seismic data acquired at a receiver station from seismic signals propagating in a medium, the method comprising the steps of:

selecting a first portion of the seismic data; and

determining a calibration filter from the first portion of the seismic data, the calibration filter being to calibrate a first component of the seismic data relative to a second component of the seismic data;

wherein the step of determining the calibration filter comprises processing the data in the common shot domain.

2. (Original) A method as claimed in claim 1 and comprising applying the calibration filter to the second component of the seismic data.

3. (Currently Amended) A method as claimed in ~~any preceding~~ claim 1 wherein the seismic data are obtained from seismic signals propagating in a water column.

4. (Currently Amended) A method as claimed in claim 1~~, 2 or 3~~ wherein the second component of the seismic data is pressure.

5. (Original) A method as claimed in claim 4 and comprising determining $q(f,k)P(f,k)$ in the common shot domain, where P denotes pressure, q denotes vertical slowness, f denotes frequency and k denotes horizontal wavenumber.

6. (Currently Amended) A method as claimed in claim 4 ~~or 5~~ wherein the first component of the seismic data is a component of the particle motion.

7. (Original) A method as claimed in claim 6 wherein the first component of the seismic data is the vertical component of the particle motion.

8. (Currently Amended) A method as claimed in claim 3 ~~or in any of claims 4-7 when dependent from claim 3~~ wherein the step of determining the calibration filter further comprises

~~comprising~~ determining a calibration filter that minimizes the energy immediately above the base of the water column of the down-going constituent of the first component of the seismic data for the selected portion of the seismic data.

9. (Original) A method as claimed in claim 8 and comprising determining a calibration filter that minimizes the energy immediately above the base of the water column of the down- going constituent of the vertical component of the particle velocity according to

$$v_z^+(f,k) = \frac{1}{2}a(f)v_z(f,k) + \frac{q(f,k)}{2\rho}P(f,k)$$

where v_z^+ denotes the down-going constituent of the vertical component of the particle velocity, v_z denotes the acquired vertical component of the particle velocity, $a(f)$ denotes the calibration filter, and ρ denotes the density of the water column.

10. (Currently Amended) A method as claimed in claim 3 ~~or in any of claims 4-7 when dependent from claim 3~~ wherein the step of determining the calibration filter <u>further comprises</u> ~~comprising~~ determining a calibration filter that minimizes the difference, after muting the direct wave, between up-going energy in the water column and down-going energy in the water column.

11. (Original) A method as claimed in claim 10 and comprising determining a calibration filter that minimizes the following objective function:

$$E=\sum_{f,k} W(f,k)(|V_z^-(f,k))| - |V_z^{(r)+}(f,k))|)^2,$$

where $W(f,k)$ is a weighting function, V_z^- is the up-going constituent of the vertical particle velocity, and $V_z^{(r)+}$ is the down-going constituent of the vertical particle velocity after muting of the direct wave.

12. (Currently Amended) A method <u>as claimed in claim 1 further</u> ~~of seismic surveying~~ comprising the steps of:

actuating a source of seismic energy <u>to generate the seismic signals</u>; and

acquiring the seismic data at the ~~a~~ receiver station spatially separated from the source~~;~~

~~and processing the data by a method as defined in any of claims 1 to 11~~.

13. (Currently Amended) A method as claimed in claim 1 further ~~any preceding claim and~~ comprising applying the calibration filter to a second portion of the seismic data acquired at the receiver station.

14. (Original) An apparatus for processing multi-component seismic data acquired at a receiver station from seismic signals propagating in a medium, the apparatus comprising:

means for determining a calibration filter from a first portion of the seismic data, the calibration filter being to calibrate a first component of the seismic data relative to a second component of the seismic data;

wherein the apparatus is adapted to determine the calibration filter by processing the seismic data in the common shot domain.

15. (Original) An apparatus as claimed in claim 14 and adapted to filter the second component of the seismic data in the common shot domain.

16. (Original) An apparatus as claimed in claim 15 and adapted to filter the acquired pressure seismic data in the common shot domain.

17. (Original) An apparatus as claimed in claim 16 and adapted to determine $q(f,k)P(f,k)$ in the common shot domain, where P denotes pressure, q denotes vertical slowness, f denotes frequency and k denotes horizontal wavenumber.

18. (Currently Amended) An apparatus as claimed in claim ~~any of claims~~ 14 ~~to 17~~ and comprising a programmable data processor.

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (New) A programmable apparatus, comprising:

a programmable data processor;

a program storage medium encoded with instructions that, when executed by the programmable data processor, perform a method of processing multi-component seismic data acquired at a receiver station from seismic signals propagating in a medium, the method including:

selecting a first portion of the seismic data; and

determining a calibration filter from the first portion of the seismic data, the calibration filter being to calibrate a first component of the seismic data relative to a second component of the seismic data;

wherein the step of determining the calibration filter comprises processing the data in the common shot domain.

23. (New) A programmable apparatus as claimed in claim 22, wherein the encoded method further includes applying the calibration filter to the second component of the seismic data.

24. (New) A programmable apparatus as claimed in claim 22 wherein the seismic data are obtained from seismic signals propagating in a water column.

25. (New) A programmable apparatus as claimed in claim 22 wherein the second component of the seismic data is pressure.

26. (New) A programmable apparatus as claimed in claim 22, wherein the encoded method further includes applying the calibration filter to a second portion of the seismic data acquired at the receiver station.

27. (New) A programmable apparatus as claimed in claim 22 wherein the program storage medium is encoded with the seismic data.

28. (New) A program storage medium encoded with instructions that, when executed by a programmable data processor, perform a method comprising:

selecting a first portion of the seismic data; and

determining a calibration filter from the first portion of the seismic data, the calibration filter being to calibrate a first component of the seismic data relative to a second component of the seismic data;

wherein the step of determining the calibration filter comprises processing the data in the common shot domain.

29. (New) A program storage medium as claimed in claim 28, wherein the method further includes applying the calibration filter to the second component of the seismic data.

30. (New) A program storage medium as claimed in claim 28 wherein the seismic data are obtained from seismic signals propagating in a water column.

31. (New) A program storage medium as claimed in claim 28 wherein the second component of the seismic data is pressure.

32. (New) A program storage medium as claimed in claim 28, wherein the method further includes applying the calibration filter to a second portion of the seismic data acquired at the receiver station.

33. (New) A program storage medium as claimed in claim 28 wherein the program storage medium is encoded with the seismic data.